

Code No: 182AG

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech I Year II Semester Examinations, September - 2023

ELECTRONIC DEVICES AND CIRCUITS

(Common to CSE, IT, CSIT, CE (SE), CSE (CS), CSE (DS), CSD)

Time: 3 Hours

Max. Marks: 60

**Note:** This question paper contains two parts A and B.i) **Part- A** for 10 marks, ii) **Part - B** for 50 marks.

- Part-A is a compulsory question which consists of ten sub-questions from all units carrying equal marks.
- Part-B consists of **ten questions** (numbered from 2 to 11) **carrying 10 marks each**. From each unit, there are two questions and the student should answer one of them. Hence, the student should answer five questions from Part-B.

**PART- A****(10 Marks)**

- |      |   |     |
|------|---|-----|
| 1.a) | Define Diffusion capacitance.                                   | [1] |
| b)   | What are the Majority and Minority Carriers in a Semiconductor? | [1] |
| c)   | What is meant by rectifier?                                     | [1] |
| d)   | Define Peak Inverse Voltage (PIV).                              | [1] |
| e)   | What are the three regions of a Transistor?                     | [1] |
| f)   | List the applications of BJT.                                   | [1] |
| g)   | What is MOSFET? Why it is called so?                            | [1] |
| h)   | Draw the symbols of JFET (N Channel/P Channel).                 | [1] |
| i)   | List out the applications schottky diode.                       | [1] |
| j)   | What are direct band gap semiconductors?                        | [1] |

**PART - B****(50 Marks)**

- 2.a) Find the value of D.C. resistance and A.C resistance of a Germanium junction diode at  $25^{\circ}\text{C}$  with reverse saturation current,  $I_0 = 25\mu\text{A}$  and at an applied voltage of 0.2V across the diode.
- b) Explain the operation of PN Junction Diode in Forward Bias and Reverse Bias. [4+6]

**OR**

- 3.a) Difference between i) Static and dynamic resistances of a p – n diode. ii) Transition and Diffusion capacitances of a p – n diode.
- b) The voltage across a silicon diode at room temperature of  $300^{\circ}\text{K}$  is 0.7V when 2mA Current flows through it. If the voltage increases to 0.75V, calculate the diode current. [6+4]

- 4.a) Compare Half Wave, Full Wave Centre tap and Bridge rectifiers.
- b) A HWR circuit supplies 100mA DC current to a  $250\Omega$  load. Find the DC output voltage, PIV rating of a diode and the r.m.s. voltage for the transformer supplying the rectifier. [5+5]

**OR**

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- 5.a) Explain the working of Bridge rectifier. Give the expressions for ripple factor and efficiency.  
b) Discuss positive clippers with and without bias with the help of waveforms. [5+5]

QA

- 6.a) Explain the working of NPN and PNP transistor.  
b) With the help of input and output characteristics, explain the operation of a BJT in Common Base Configuration. [5+5]

**OR**

7. Explain how Transistor acts as a switch. Also, define different transistor switching times. [10]

QA

- 8.a) Distinguish between JFET and MOSFET.  
b) With a neat sketch, explain the characteristics of P-channel JFET. [5+5]

**OR**

- 9.a) Differentiate between enhancement and depletion modes of a MOSFET with the help of its characteristics and construction.  
b) Write short notes on applications of FET as a voltage variable resistor. [5+5]

QA

- 10.a) What is solar cell? Explain the construction and working principle of solar cell.  
b) Write the applications of solar cell. [7+3]

**OR**

- 11.a) Explain the construction and working of photo diode.  
b) Describe the construction and working of UJT with its equivalent circuit and V-I characteristics. [5+5]

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